Notes on using Analog Devices' DSP, audio, & video components from the Computer Products Division
Phone: (800) ANALOG-D or (781) 461-3881, FAX: (781) 461-3010, EMAIL: dsp.support@analog.com

SHARC Link Port Timing Notes

Last Modified: 6/19/97

OVERVIEW:

This Engineer's Note will show how to calculate for maximum skew allowed between LCLK and LDATA at a receiver link port, as well as how to calculate the maximum transmission delay between 2 link ports.

Updated 11/11/96
Changes to the datasheet dated 4/96:
These specifications are "final" for rev. 2.0 ADSP-21062.

1x CLK Speed Operation:

tLCLKTWL (tCK/2)+1.25 Max

tLCLKTWH (tCK/2)-1.25 Min

2x CLK Speed Operation:

tSLDCL 2.25 Min

tLCLKRWL 4.5 Min

tDLDCH 2.25 Max

tHLDCH -2.0 Min

tLCLKTWL (tCK/4)-1 Min, (tCK/4)+1 Max

tLCLKTWH (tCK/4)-1 Min, (tCK/4)+1 Max

Calculation for maximum skew allowed between LCLK and LDATA at receiver:

At tCK = 25ns

Setup Skew 2x = tLCLKTWH (Min) - tDLDCH - tSLDCL = (tCK/4)-1 - 2.25 - 2.25 = 0.75 ns

Hold Skew 2x = tLCLKTWL (Min) + tHLDCH - tHLDCL = (tCK/4)-1 - 2 - 2.25 = 1 ns

Setup Skew 1x = tLCLKTWH (Min) - tDLDCH - tSLDCL = (tCK/2)-1.25 - 2.5 - 3 = 5.75 ns

Hold Skew 1x = tLCLKTWL (Min) + tHLDCH - tHLDCL = (tCK/2)-1 - 3 - 3 = 5.5 ns

At tCK = 30ns

Setup Skew 2x = tLCLKTWH (Min) - tDLDCH - tSLDCL = (tCK/4)-1 - 2.25 - 2.25 = 2 ns

Hold Skew 2x = tLCLKTWL (Min) + tHLDCH - tHLDCL = (tCK/4)-1.25 - 1.75 - 2.25 = 2.25 ns

Setup Skew 1x = tLCLKTWH (Min) - tDLDCH - tSLDCL = (tCK/2)-1.25 - 2.5 - 3 = 9.5 ns

Hold Skew 1x = tLCLKTWL (Min) + tHLDCH - tHLDCL = (tCK/2)-1 - 3 - 3 = 8 ns

Calculation for maximum transmission delay between two Link Ports:

- The maximum transmission delay (tPROP) only is affected by the time required for the receiver to bring the LACK~ pin low at the transmitter if a stall is needed. LACK~ can be brought high asynchronous to the transmitter so tPROP for that situation is not important.

- If a stall is required LACK~ is brought low by the receiver tDLALC after the 2nd rising edge of LCLK~ at the receiver. LACK~ must be setup tSLACH before the 8th (or 12th for 48-bit xfers) rising edge of LCLK at the transmitter.

- The transmission delay must satisfy this equation where tPROP is the one way transmission delay of LACK~ pin:

(7*tCK/2) >= tDLALC + tPROP + tSLACH + tPROP

tPROP <= [(7*tCK/2) - tDLALC - tSLACH]/2

At tCK = 25ns

2x rate tPROP <= [(7*tCK/2) - tDLALC - tSLACH]/2 = [87.5-16-19]/2 = 26.25ns

1x rate tPROP <= [(7*tCK) - tDLALC - tSLACH]/2 = [175-16-19]/2 = 70ns

At tCK = 30ns

2x rate tPROP <= [(7*tCK/2) - tDLALC - tSLACH]/2 = [105-16-19]/2 = 35ns

1x rate tPROP <= [(7*tCK) - tDLALC - tSLACH]/2 = [210-16-19]/2 = 87.5ns